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PATENT

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Attorney Reference Number 3382-64472-01
Application Number 10/622,378Remarks

The Applicants respectfully request reconsideration in view of the foregoing amendments and following remarks.

I. Procedural Background.

In the Office action dated January 4, 2007, the Examiner imposed a restriction requirement, splitting claims 1-73 into 10 groups.

In response, the Applicants elected the claims of group I (claims 1-17) with traverse but also proposed an alternative grouping of the claims, under which the Applicants elected the claims of Group A (claims 1-23) without traverse.

In the Office action dated May 18, 2007, the Examiner acknowledged the Applicants' election without traverse of claims 1-23 and examined claims 1-23. The Examiner then rejected claims 1, 3-8, 10 and 13-22 as being unpatentable under 35 U.S.C. § 102, and rejected claims 2, 9, 11, 12 and 23 as being unpatentable under 35 U.S.C. § 103.

In the amendment filed August 27, 2007, the Applicants canceled claims 8, 9, 11-17 and 22-73, amended claims 1-3, 4, 10, 18, 20 and 21 and added claims 74-120. In view of recent correspondence from the Office, the Applicants understand the amendment filed August 27, 2007, is considered to be a non-compliant amendment and was not entered. The amendments shown above therefore show changes relative to the originally filed claims.

In the Office action dated November 15, 2007, the Examiner imposed a second restriction requirement, separating the pending claims 1-7, 10, 18-21 and 74-120 into two groups.

In response, the Applicants elected the claims of group I (claims 1-7, 10, 74-84 and 109-120 with traverse, explaining why the claims of group I should be examined with the claims of group II. In view of recent correspondence from the Office, the Applicants understand the second restriction requirement to be moot.

In the Notice, the Examiner indicates the amendment filed August 27, 2007, is considered non-compliant for the following reason. The Examiner alleges that claims 1-7, 10, 18-21 and 74-120 (as presented in the amendment filed August 27, 2007) are "directed to an invention that is independent or distinct from the invention originally claimed" in previously elected claims 1-23. In particular, at pages 2-3, the Examiner writes:

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[T]he amendment filed 8/27/2007 claims the determination of the fraction is independent of the actual temporal distance positions of the respective reference image. Since newly amended claims now claim the determination of fraction is independent of the temporal distance position, which is different from the original elected invention, which claim the fraction represents an estimated temporal distance position for the current image relative to an interval between a first reference image for the current image and a second reference image for the current image.

The Examiner then writes, "Since the applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 1-7, 10, 18-21 and 74-120 withdrawn from consideration as being directed to a non-elected invention." Notice, page 3.

From these statements, it seems the Examiner considers the amendment filed August 27, 2007, to be non-compliant because its entry would result in the withdrawal of all pending claims from consideration (as being directed to "a non-elected invention"). The Applicants respectfully disagree with the Examiner's analysis, as more fully explained below. Nonetheless, to expedite prosecution, in the present amendment, the Applicants have reworked the amendments previously made in the amendment filed August 27, 2007. As currently styled, the amendments generally add language to original claims 1-23. The amendments do not result in claims "directed to an invention that is independent or distinct from the invention originally claimed" in previously elected claims 1-23.

II. Original Claims 1-23 and the Amendment Filed August 27, 2007

Original claim 1 included the language "the fraction represents an estimated temporal distance position for the current image relative to an interval between a first reference image for the current image and a second reference image for the current image." Different dependent claims indicated the processing of original claim 1 could occur as part of encoding (claim 11) or decoding (claim 12). Other dependent claims addressed (a) a way of determining the fraction by evaluating "bit costs for encoding the current image" using different fractions (claim 9), (b) how the fraction could be parameterized (claims 2-4), and (c) the case where the "the estimated temporal position for the current image relative to the interval between the first reference image for the current image and the second reference image for the current image is not the true temporal position of the current image" (claim 5). As pointed out in the application as filed:

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The estimated temporal position *may or may not be the true temporal position of the current image*. The fraction can be determined by evaluating different fractions to determine bit costs for encoding the current image using the different fractions, and selecting a fraction from among the different fractions.

Application, page 8, lines 4-7, emphasis added. *See also* page 27, lines 24-25 – “The fraction may or may not reflect true interframe distances.” The application even indicates that different B-frames between two anchor reference frames can use the same fraction for direct mode prediction, even though the different B-frames have different true temporal positions. “There is no restriction on the uniqueness of BFACTION among B-frames between the same two anchors. For example, different B-frames with identical anchor frames may have the same BFACTION value.” Application, page 24, lines 25-27.

The Applicants note that *the issue of what the fraction represents (e.g., true/not true temporal distance position of the current image) is different than the issue of how the fraction is determined (e.g., by evaluating different bit costs during encoding, by decoding a code that indicates the fraction during decoding)*. In the amendment filed August 27, 2007, the Applicants added language further detailing how the fraction is determined – “the determination of the fraction is independent of actual temporal distance positions of the respective reference images.”

Specifically, in the amendment filed August 27, 2007, the Applicants amended claim 1 as follows.

- (1) The Applicants amended claim 1 to focus on decoding, as opposed to processing that is generic to decoding and encoding (as in original claim 1). The Examiner apparently does not object to these changes, and the Applicants have repeated these changes above.
- (2) The Applicants changed “an estimated temporal distance position” to “a selected temporal distance position.” The Examiner has objected to this change. In the present amendment, to expedite prosecution, the Applicants have not repeated this change.
- (3) The Applicants added the language “wherein the determination of the fraction is independent of actual temporal distance positions of the respective reference images” to claim 1. The added language addresses how the fraction is determined (e.g., by decoding a code that indicates the fraction) as opposed to what the fraction represents.
- (4) To focus on the application of video decoding, the Applicants changed “processing the fraction along with the motion vector results in a representation of motion in the current

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image relative to the first reference image” to “using the fraction and the motion vector in motion compensation for the current image.” In the present amendment, to expedite prosecution, the Applicants have not repeated this change, but have added language about “motion compensation” and a “direct mode macroblock” to the claims.

III. Response to the Office Action Dated May 18, 2007.

The Examiner indicates the amendment filed August 27, 2007, is considered non-compliant. In the interest of completeness, the Applicants reiterate the arguments presented in the amendment filed August 27, 2007, making adjustments as appropriate to reflect the changes to the claims made in the present amendment.

Upon entry of the present amendment, claims 1-7, 10, 18-21 and 74-112 are pending in the application. Claims 8, 9, 11-17 and 22-73 are canceled without prejudice. No claims have been allowed. Claims 74-112 have been added. Claims 1, 18, 80, 89, 99 and 109 are independent.

Allowability of Claims Under 35 U.S.C. 102

The May 18 Office action rejects pending claims 1, 3-7, 10 and 18-21 under 35 U.S.C. 102(e) as allegedly being anticipated by U.S. Patent Application Publication No. 2005/0129120A1 (“Jeon”). Applicants do not admit that Jeon is prior art to the present application and reserve the right to provide evidence of prior conception and/or reduction to practice.

For a rejection under 35 U.S.C. § 102 to be proper, the applied art must show each and every element as set forth in a claim. Applicants respectfully submit that the claims in their present form are allowable over Jeon because it does not teach or suggest all the claim limitations of any of claims 1, 3-7, 10 and 18-21.

Independent Claim 1

As amended, independent claim 1 recites in part:

receiving and decoding a code in a bit stream to determine a fraction for a current image in the sequence, wherein the fraction represents an estimated temporal distance position for the current image relative to an interval between a first reference image for the current image and a second reference image for the

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current image, and wherein the determination of the fraction is independent of actual temporal distance positions of the respective reference images.

As amended, independent claim 18 recites in part:

determining a fraction for a current image in the sequence, wherein the current image has a previous reference image and a future reference image, and wherein the fraction represents a temporal position for the current image relative to the respective reference images;

...
outputting a code in a bit stream, wherein the code represents the fraction, and wherein the outputting the code *facilitates determination of the fraction independent of actual temporal positions of the respective reference images during decoding.*

Applicants respectfully disagree that Jeon teaches or suggests the above-cited language of claims 1 and 18, respectively.

The Examiner states, "Jeon discloses . . . determining a fraction for a current image in the sequence, wherein the fraction represents an estimated temporal distance position for the current image relative to an interval between a first reference image for the current image and a second reference image for the current image (fraction = TD_B / TD_D)" May 18 Office action, at p. 2. Jeon describes calculating direct mode motion vectors MV_F and MV_B according to equations such as " $MV_F = TD_B \times MV / TD_D$ " and " $MV_B = (TD_B - TD_D) \times MV / TD_D$." See Jeon at ¶ [0052]. According to Jeon, " TD_B represents a temporal distance between a current B frame and a list 0 reference frame, and TD_D represents a temporal distance between a list 1 reference frame and the list 0 reference frame." *Id.* at ¶ [0053]. Thus, the direct mode motion vectors in Jeon are computed using actual temporal distances of reference frames or fields. See, e.g., *id.* at ¶¶ [0052]-[0053], [0059]-[0060].

Even if, for the sake of argument, equations such as " $MV_F = TD_B \times MV / TD_D$ " in Jeon could be considered to show a fraction that represents a temporal distance position for a current image, Jeon still does not teach or suggest "the determination of the fraction is independent of actual temporal distance positions of the respective reference images" (as recited in claim 1) or "determination of the fraction independent of actual temporal positions of the respective reference images during decoding" (as recited in claim 18).

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The present application describes example implementations of technology falling within the scope of claims 1 and 18. These example implementations have certain advantages over the prior art applied by the Examiner. For example, at page 27 the application states,

As noted above, prior implementations scaled the motion vector of the corresponding macroblock in the future reference frame using timestamp-dependent temporal distances TR_D and TR_B . Fraction coding eliminates the need to find TR_D and TR_B . Furthermore, in some embodiments, an encoder can change the fraction to represent (e.g., at frame level) different inter-B-frame distances and different numbers of B-frames in a group of pictures. The fraction may or may not reflect true interframe distances. Thus, described embodiments do not necessarily assume constant velocity. . . .

Claims 1 and 18 are allowable. Claims 3-7 and 10 depend from claim 1 and are allowable for at least the reasons given above in support of claim 1. Claims 19-21 depend from claim 18 and are allowable for at least the reasons given above in support of claim 18. Therefore, the rejections of claims 1, 3-7, 10 and 18-21 under 35 U.S.C. § 102 should be withdrawn. Such action is respectfully requested. The Applicants will not belabor the merits of the separate patentability of dependent claims 3-7, 10 and 19-21.

The rejection of claim 2 is addressed below.

Allowability of Claims Under 35 U.S.C. § 103

Claim 2 was rejected under 35 U.S.C. 103(a) as being unpatentable over Jeon. Applicants respectfully traverse this rejection.

The applied art does not teach or suggest each and every element of dependent claim 2. Although Jeon describes calculations of direct mode motion vectors using actual temporal positions of reference frames or fields, Jeon does not teach or suggest, for example, "the determination of the fraction is independent of actual temporal distance positions of the respective reference images," as recited in claim 1, from which claim 2 depends.

Because the applied art does not teach or suggest at least one element of independent claim 1, claim 2 is allowable for at least the reasons given above in support of its parent claim. Therefore, the rejection of claim 2 under 35 U.S.C. § 103(a) should be withdrawn. Such action is respectfully requested. The Applicants will not belabor the merits of the separate patentability of dependent claim 2.

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New Claims

Claims 74-112 have been added. Claims 74-79 depend directly or indirectly from claim 1 and are allowable for at least the reasons given above in support of claim 1. Computer-readable storage media claims 80-88 are based on method claims 1-7, 74 and 75, respectively. Claims 89-98 are encoder-side method claims generally based on claims 1-7, 74, 75 and 9, respectively. Claims 99-108 are computer-readable storage media claims corresponding to method claims 89-98. Computer-readable storage media claims 109-112 are based on method claims 18-21, respectively. Support for the new claims can be found throughout the description in the application. See, e.g., Application at pp. 7, 8, 24-28.

Request For Interview

If any issues remain, the Examiner is formally requested to contact the undersigned attorney prior to issuance of the next Office action in order to arrange a telephonic interview. It is believed that a brief discussion of the merits of the present application may expedite prosecution. Applicants submit the foregoing formal Amendment so that the Examiner may fully evaluate Applicants' position, thereby enabling the interview to be more focused.

This request is being submitted under MPEP § 713.01, which indicates that an interview may be arranged in advance by a written request.

Conclusion


The claims in their present form should now be allowable. Such action is respectfully requested.

Respectfully submitted,

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